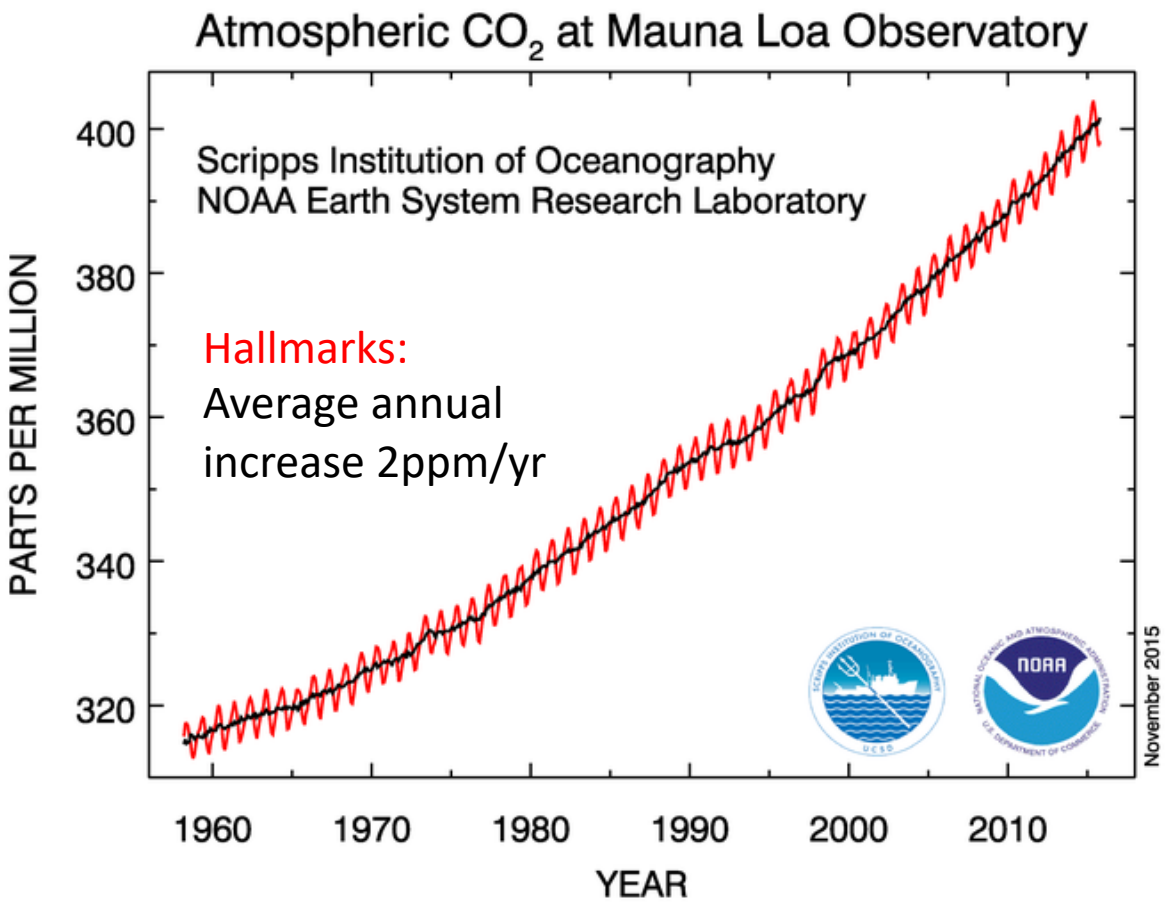
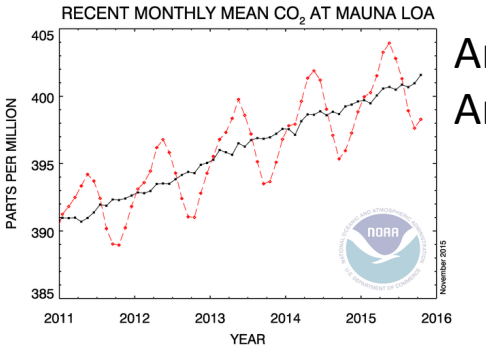
Great Climate and Glacier Graphs and Maps

5 Great Graphs: The Keeling Curve (CO_2)

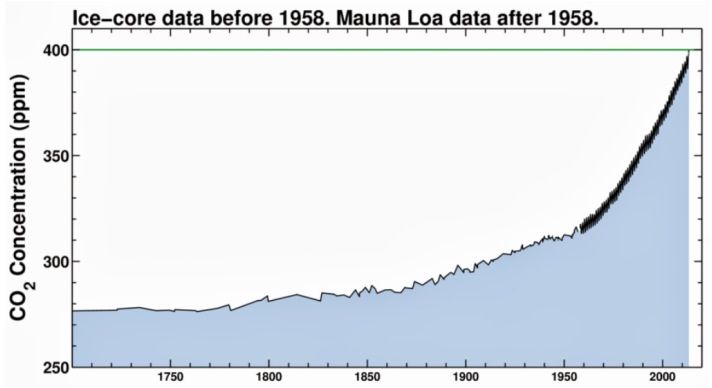


Hallmarks: Seasonal fluctuation



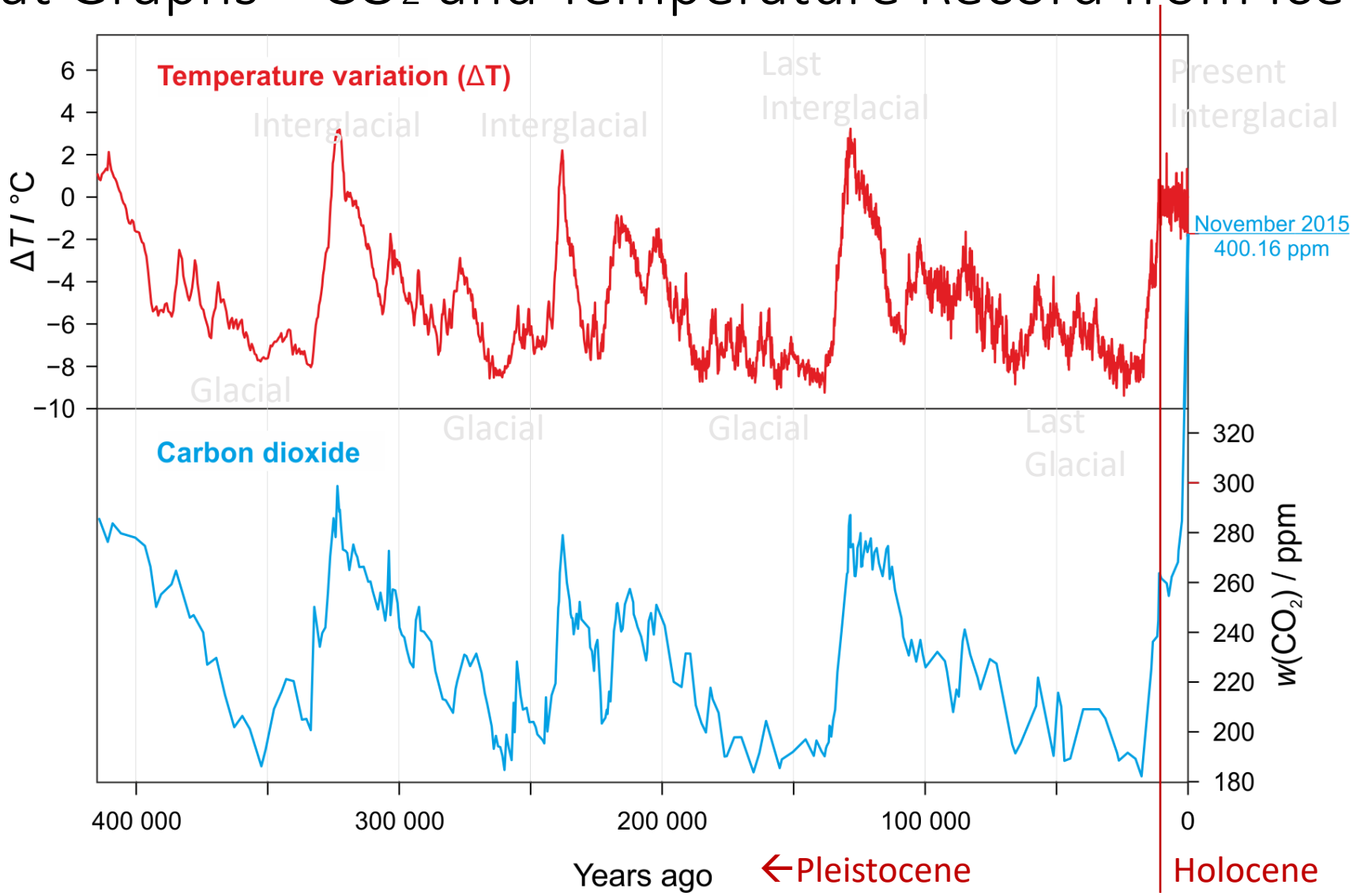
Annual peak—Apr/May
Annual low—Sep/Oct

Hallmarks: Holocene CO2
Stable before 1800



Dr. Pieter Tans, NOAA/ESRL (www.esrl.noaa.gov/gmd/ccgg/trends/) and Dr. Ralph Keeling, Scripps Institution of Oceanography (scrippsco2.ucsd.edu/), Accessed 11/30/15

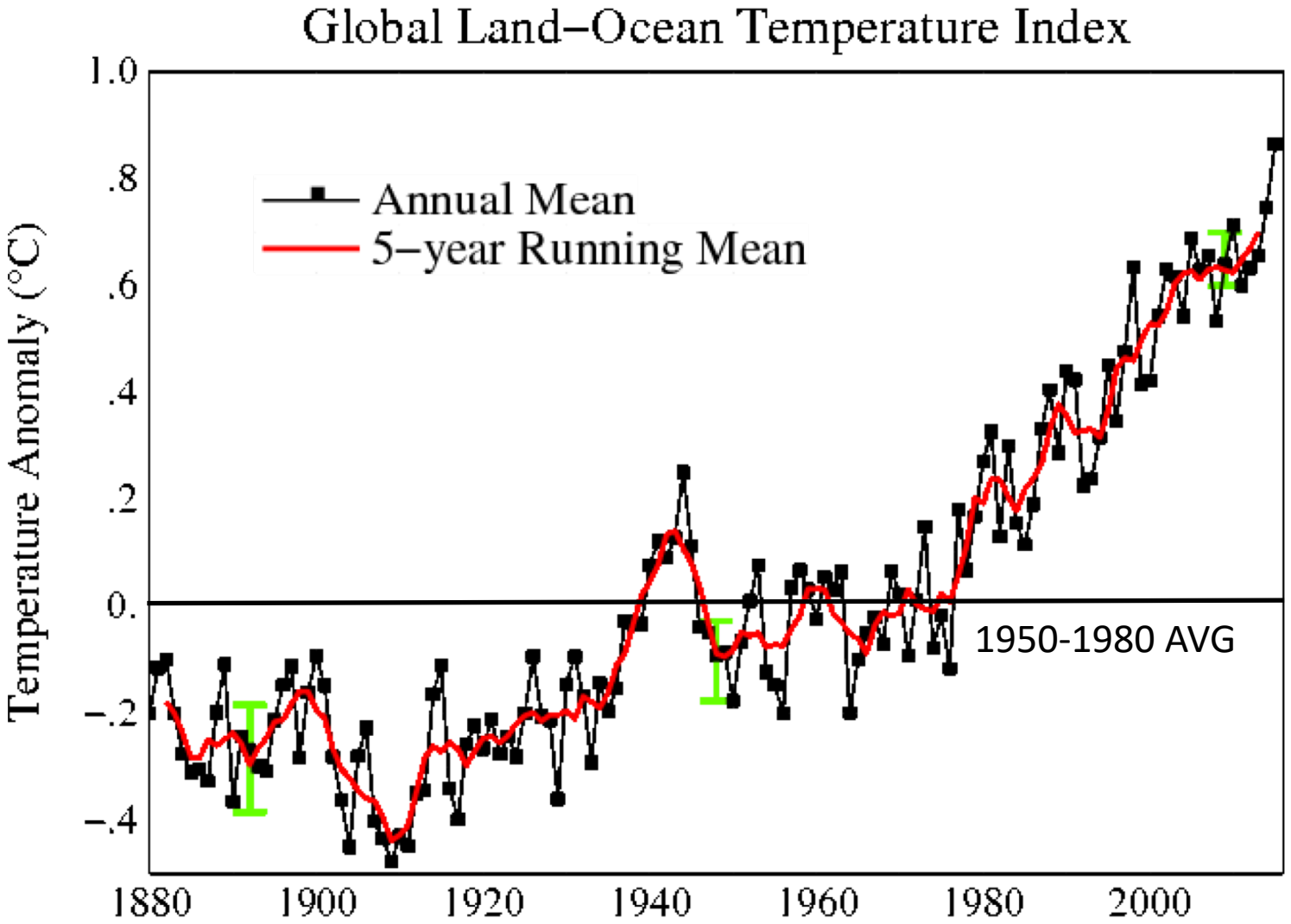
5 Great Graphs—CO_2 and Temperature Record from Ice Cores



Hallmarks:

- Glacial and interglacial cycles
- Units of CO2 measure
- Natural ranges (180-290), modern level (400)

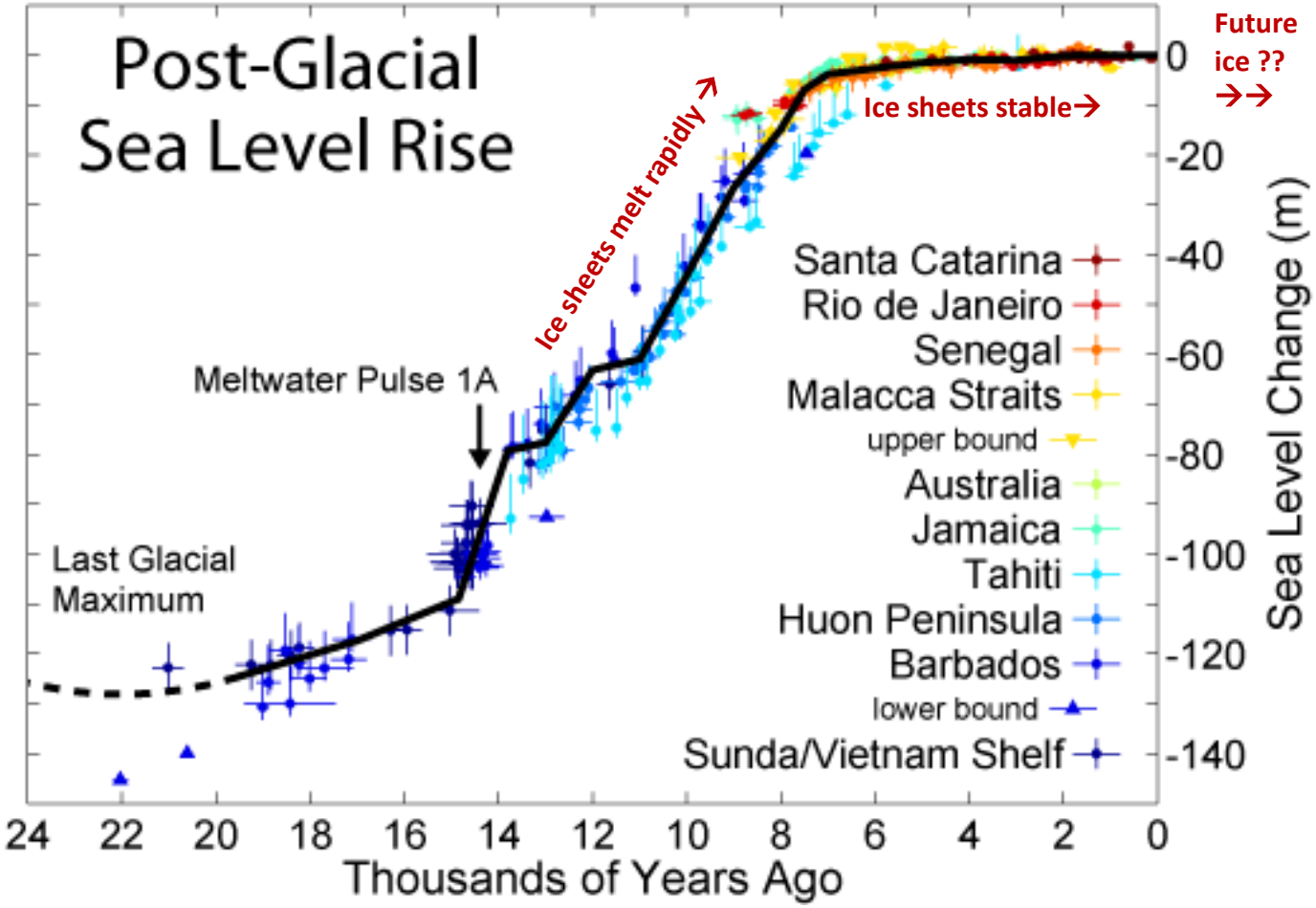
5 Great Graphs—Global Mean Temperature since 1880



Hallmarks:

- Interannual variability
- Increase since 1900 = 1°C
- Anomaly relative to 1950-1980 average
  - **Caution**—temperature trends use several different time periods to define average

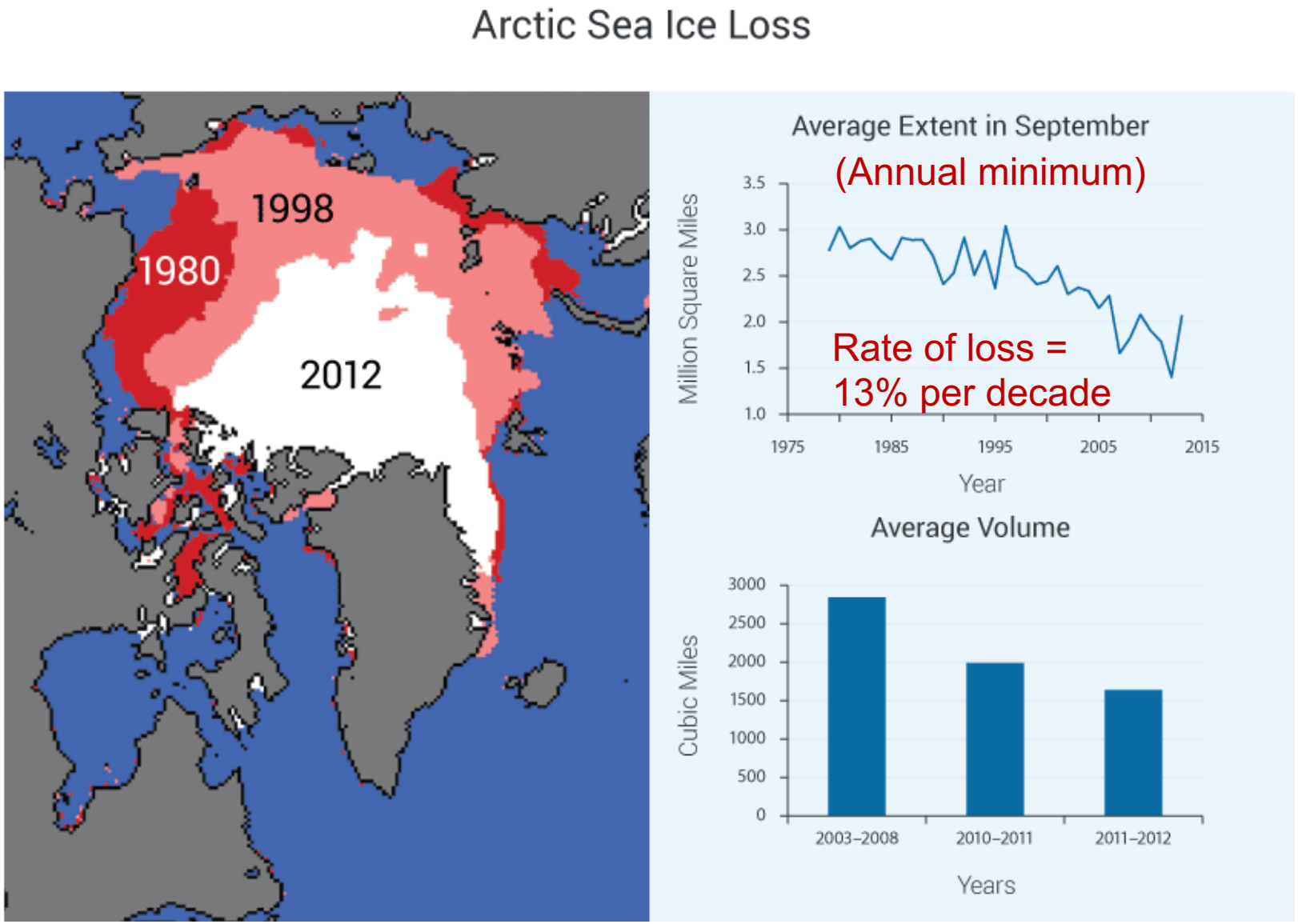
5 Great Graphs—Post-Glacial Sea Level Rise (since end of last glacial cycle)



Hallmarks:

- Total sea level difference of 120 meters
- Rapid rise before 6,000 years ago due to rapid ice sheet melting
- Very slow rise for past 5,000 years; ice sheets are stable at their current sizes
  - Present rate of sea level rise is 3-5x faster than the last 5,000 years
- Highest sea level at the last interglacial period (120,000 years ago—not on this graph) was 5 meters higher than sea level today

5 Great Graphs: Arctic Ocean Sea Ice Extent



Hallmarks:

- Interannual variability
- Extent must be compared from year to year using the same month due to seasonal growth and melt cycles
  - September represents the maximum melt each year
- Smallest extent in 2012
- Extent after 2005 lower in all years than in any previous year
- Volume decrease indicates *thinning* ice in addition to shrinking *area*